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ROTOR AND FOCAL SOURCE LOCATION DIFFERENCES BETWEEN PAROXYSMAL AND PERSISTENT ATRIAL FIBRILLATION

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Background: Clinically, ablation strategies for paroxysmal atrial fibrillation (ParoxAF) target pulmonary veins, while those for persistent AF (PersAF) include ablation of non-pulmonary vein (PV) targets such as the posterior left atrium (LA), but the mechanistic explanation for the relative success of this empiric approach has been elusive. We hypothesized that AF-sustaining rotors and focal sources would more commonly localize near the PVs in ParoxAF versus the posterior LA and right atrium (RA) in PersAF.

Methods: Using data from the Conventional versus Focal Impulse and Rotor Modulation (CONFIRM) trial, rotor locations identified from movies created using contact panoramic mapping (RhythmView, Topera Medical), were categorized by location using patient-specific 3-dimensional electroanatomic mapping data (NavX, St. Jude Medical, and Carto, Biosense-Webster). Locations typically included in left and right wide area circumferential ablation were classified as left and right pulmonary vein locations.

Results: Of the 107 patients enrolled in the CONFIRM trial, (age 62±8 years, 72% PersAF), AF was sustained in 101, allowing mapping of AF sources. A total of 214 drivers were identified: 174 rotors (81%) and 40 focal sources (19%). In ParoxAF, more sources (19/55, 35%) were located near PVs than PersAF (26/159, 16%, p=0.004). In PersAF, there were significantly more extra-PV sources, particularly in the posterior LA and RA (53/159, 33%) vs Parox AF (9/55, 16%, p=0.0.017).

Conclusions: In CONFIRM, AF-sustaining sites for PersAF were more commonly located distant from the PVs compared with ParoxAF. This mechanistically explains the limited success of empiric strategies targeting the posterior LA, and also the improved success of FIRM-guided ablation in the CONFIRM trial, which also included RA source ablation.